

PARONYCHIA CHARTACEA SSP. MINIMA  
(CARYOPHYLLACEAE): A NEW SUBSPECIES  
OF A RARE FLORIDA ENDEMIC

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ABSTRACT

*Paronychia chartacea* ssp. *minima* (Caryophyllaceae) from the Florida panhandle is formally described. The new subspecies is polygamodioecious and exhibits sexual dimorphism. It is distinguished from *P. chartacea* ssp. *chartacea* of peninsular Florida, and a map of their ranges is given.

Florida is noted for its relatively large number of rare or endemic plants (Ward 1979). Muller et al. (1989) list 235 endemic and 40 nearly endemic taxa of vascular plants in Florida. Many of the state's endemics are concentrated in three areas: (1) the Miami Ridge pine rocklands of Dade and Monroe counties; (2) the Central Ridge of peninsular Florida, especially the Lake Wales Ridge in Highlands and Polk counties with its sand pine scrub, which is noted for a number of endemic *Dicerandra* species (Christman and Judd 1990); and (3) the wetlands of the Apalachicola River basin of Franklin, Liberty, Gulf, and Bay counties, which house two endemic monotypic genera — *Harperocallis* and *Stachydeoma*.

One of the endemics of the Lake Wales Ridge is *Paronychia chartacea* Fern. (the papery nailwort or whitlow-wort). It is considered endangered in Florida (Wood 1990) and is listed nationally as threatened (Federal Register, 21 Jan 1987). It has smaller flowers than any other *Paronychia* in the world. Small (1925) erected the genus *Nyachia* for it (as *N. pulvinata*), and Fernald (1936) transferred the species to *Paronychia* as *P. chartacea* because the name *P. pulvinata* was pre-empted. Recent authors have followed Fernald's placement (Core 1941, Chaudhri 1968, Ward 1977).

*Paronychia chartacea* is occasional in open sand scrub on Lake Wales Ridge but can be locally abundant on disturbed sites such as along fire lanes or trails (VanderKloet 1986) or in response to fire in the scrub (Johnson and Abrahamson 1990). The Florida Natural Areas Inventory has recorded 124 occurrences of this species, but Christman and Judd (1990) note that a Lake County specimen was misidentified. Its present range is much smaller

than its historical range because more than 70% of the southern Lake Wales Ridge xeric uplands has been lost to citrus cultivation and residential development in the past 40 years (Myers 1990).

While surveying plants of the karst lake region of Washington and Bay counties (which contains the endemics *Hypericum lissophloeus* Adams and *Xyris isoetifolia* Kral and near-endemics *Rhexia salicifolia* Kral & Bostick and *Xyris longisepala* Kral), I found a *Paronychia* in flower that appeared to be a new species. After obtaining fruiting material, I was convinced it was conspecific with *P. chartacea* but sufficiently distinct to warrant recognition as a subspecies.

**PARONYCHIA CHARTACEA Fern. ssp. MINIMA L. Anderson, ssp. nov.**

Plantae persimiles eis subspeciei chartaceae sed habitu minore annuali subtilliore in ramificatione, caudicibus 1 mm in crassitudine vel tenuioribus, caulibus maculis purpureis parvis notatis, foliis principalibus 1.2–3 mm latis, cymulis 1.5–4 mm latis, sepalis in maturitate plus minusve patentibus differunt.

Annual, wiry branched often matted herb; caudex (0.4) 0.7–1.0 (1.5) mm thick; stems 2–15 (24) cm long, sparsely to much branched, minutely purple spotted with vertically elongate epidermal inclusions, sparsely to densely retrorsely pubescent mostly on one side only. Leaves opposite; leaf blades 1.5–5 mm long, 1–2.3 mm wide, oblong or oblong-lanceolate to triangular-ovate, apex acute to broadly acute, margin strongly revolute, base truncate to somewhat auriculate; petiole none; stipules 0.7–2.5 mm long, lanceolate, membranous, margins fimbriate. Cymes much-branched, open, the flowers in small clusters 1.5–4 mm wide; stipular bracts shorter than to slightly longer than flowers, leafy bracts shorter to longer than flowers. Flowers 0.6–1 mm long, polygamodioecious, sparsely pubescent below with straight to somewhat hooked trichomes; sepals (3) 4–5, greenish or yellow-green to brownish, sometimes whitish-margined, oblong, 0.5–0.7 mm long, apically hooded, the prominent hood obtuse, typically with a subapical acute to obtuse mucro 0.15–0.25 mm long, the mucro often paler than the sepal body; petals absent; stamens 4–5; styles 2 or 3, distinct, 0.07–0.26 mm long. Utricle ovoid to ellipsoid, 0.5–0.6 mm long, almost smooth, slightly shorter than the sepals,  $\pm$  exposed at maturity.

TYPE: UNITED STATES. FLORIDA. WASHINGTON CO.: locally common on open, coarse, white sand of upper shoreline of Crystal Lake, 11 air mi S of Vernon, E $\frac{1}{2}$  of NE $\frac{1}{4}$  Sec 35, T1N, R15W, 1 Oct 1990, L. C. Anderson 13301 (HOLOTYPE: NY; ISOTYPES: AUA, FLAS, FSU, GA, GH, MO, SMU, UNC, US, USE VDB).

Additional specimens examined. FLORIDA: Bay Co.: River Lake, S side rte 20, 7.5 air mi NNW of Vicksburg, 3 Aug 1990, Anderson 13182 (FSU, MO, NY); Shirt Tail Lake, 7 air mi NNE of Vicksburg, 3 Aug 1990, Anderson 13184 (FSU, MO, NY); White Western

Lake, 6 air mi NW of Vicksburg, 1 Oct 1990, *Anderson 13305* (FSU, MO, NY). Washington Co.: Crystal Lake (type locality), 6 Jul 1990, *Anderson 13080* (FSU, KNK, MO, NY, UNC), 3 Aug 1990, *Anderson 13151* (FLAS, FSU, GA, MO, SMU, TENN, USCH, USE, VDB), 27 Dec 1990, *Anderson 13343* (FSU); Sand Lake, 2.5 air mi SSE of Greenhead, 3 Aug 1990, *Anderson 13160* (FSU, MO, NY); Gully Lake, 2 air mi ESE of Greenhead, 3 Aug 1990, *Anderson 13167* (FSU, NCU, USE); small pond at SW end of Gully Lake, 27 Dec 1990, *Anderson 13348* (FSU); Whitewater Lakes, N shore of main lake, 6.5 air mi ESE of Greenhead, 3 Aug 1990, *Anderson 13172* (FSU); Boat Lake, Sunny Hills, 4 air mi NE of Greenhead, 3 Aug 1990, *Anderson 13181* (AUA, BRY, FLAS, FSU, GA, GH, KNK, KSC, MO, SMU, TENN, UC, USCH, USE, VDB), 1 Oct 1990, *Anderson 13279* (FSU, NCU); 27 Dec 1990, *Anderson 13352* (FSU).

Sexual dimorphism occurs (Fig. 1). Predominantly male plants are more openly branched, usually with two successive dichotomies that result in a spindly, cruciform prostrate plant, whereas plants with predominantly bisexual or rarely pistillate flowers are more densely matted and have more numerous, shorter branches. The sexual dimorphism and the rare conditions of 3 sepals or 3 styles in this species are possibly unique in the genus.

Locally established in coarse white sand along margins of karst lakes, often in nearly pure stands, apparently favored somewhat by mild disturbance. It is either in nearly pure strands or associated with some of the following: *Amphicarpum muhlenbergianum* (Schult.) Hitchc., *Bulbostylis barbata* (Rottb.) Clarke, *B. ciliatifolia* (Ell.) Fern., *Chrysopsis lanuginosa* Small, *Eriocaulon lineare* Small, *Hypericum lissophloens*, *H. reductum* Adams, *Lachnauthes carolinianam* (Lam.) Dandy, *Lachnocaulon anceps* (Walt.) Morong, *Paronychia patula* Shinnery, *Polypremum procumbens* L., *Rhexia salicifolia*, *Rhynchospora globularis* (Chapm.) Small, *Sagittaria isoetiformis* J. G. Sm., and *Xyris longisepala*. Flowers July to October; nearly all seed shed by late December.

*Paronychia chartacea* ssp. *minima*, with its polygamodioecy and dimorphic morphology (Fig. 1), could be an example of disruptive selection (or the dimorphism could be selectively neutral). Selection pressure for better pollen dispersal possibly produced cruciform branching with longer internodes in the predominantly male plants, whereas selection for better pollen reception resulted in compactly matted plants that are repeatedly branched with shortened internodes in plants with predominantly bisexual or pistillate flowers. On the other hand, the compact form may be advantageous for successful protection, maturation, or dispersal of the seed. Sexual dimorphism is present, but much less pronounced, in ssp. *chartacea*.

Quantitative differences between the subspecies are listed in Table 1.

The two subspecies of *P. chartacea* also differ in longevity. Plants of ssp.



FIG. 1. Old plants of *Paronychia chartacea* ssp. *minima* (Anderson 13343) showing extremes in sexual dimorphism; compact hermaphroditic or functionally female plant is on the left, and loosely branched functionally male plant is on the right (with one of its dichotomous branches broken off).

TABLE 1. Some quantitative differences between subspecies of *P. chartacea*.

| Feature                           | ssp. <i>minima</i>  | ssp. <i>chartacea</i> |
|-----------------------------------|---------------------|-----------------------|
| Caudex (stem base) width, mm      | (0.4) 0.7–1.0 (1.5) | (1.0) 1.5–3.5 (4.2)   |
| Leaf width, mm                    | 1.2–3.0             | 0.5–1.5               |
| Flower cluster (cymule) width, mm | 1.5–4.0             | 3.0–20.0              |

*minima* are strictly annual and generally smaller, have more delicate, frequently cruciform, branching and less reddish-brown pigmentation, but have colored epidermal inclusions on the stems. *Paronychia chartacea* from Lake Wales Ridge (i.e., ssp. *chartacea*) has repeatedly been described as annual (Small 1925, Core 1941, Chaudhri 1968, Ward 1977, Christman and Judd 1990, Johnson and Abrahamson 1990), but it is often a short-lived perennial. Many specimens exhibit dead tops with green, new branches developed toward the base of the plant. They form larger mats (seldom with cruciform pattern) and generally have darker coloration but lack the purple epidermal inclusions.

Much of the distinction between the two subspecies is a matter of degree. Plants of ssp. *minima* seem somewhat less pubescent than those of ssp. *chartacea*. The sepal mucro is more prominent in most plants of ssp. *minima*; the mucro is usually shorter and blunter in ssp. *chartacea*. At maturity the sepals of ssp. *minima* frequently spread open, whereas sepals of ssp. *chartacea* remain directed forward. Collections of ssp. *minima* are mainly from July through October (plants collected in December were overly mature and dry; the stems were more or less disarticulated), whereas ssp. *chartacea* has been collected throughout the year (mainly August through March).

With the description of *Paronychia chartacea* ssp. *minima*, both subspecies qualify as taxa of special concern and should be officially protected because of the limited range for each subspecies. The species continues to be a Florida endemic (Fig. 2), but it now has an interrupted distribution between two centers of high endemism in the state (the karst lake area is adjacent to the Apalachicola River system and could be considered part of that region of high endemism).

Other examples linking these two areas of high endemism are rare. An example in *Conradina* comes to mind (see Shinnars 1962). *Conradina canescens* (T. & G.) Gray tends to occur in sand near the gulf coast from Wakulla County, Florida, westward through the Apalachicola region to coastal sites in Alabama and Mississippi. It has also been found inland bordering a karst lake in Washington County (Anderson 13295, FSU), but *P. chartacea* was absent at that particular lake. The closely related *Conradina*

*brevifolia* Shinnery is a scrub endemic of the Lake Wales Ridge in Polk and Highland counties. Wunderlin (1982) apparently considers the two con-specific because he lists the plants from Polk and Highlands counties as *C. canescens*. An additional endemic, *C. glabra* Shinnery, occurs solely in the Apalachicola River region; whereas another endemic, *C. grandiflora* Small, occurs just east of the Lake Wales Ridge.

Two rare, closely related lupines have somewhat similar distributional patterns. *Lupinus westianus* Small is endemic to the Florida panhandle, and *L. aridorum* McFarlin ex Beckner is restricted to the Central Ridge in Orange and Polk counties. Another example is the rare lichen *Cladonia perforata* Evans, which involves one of these centers of endemism. This *Cladonia* is known from Okaloosa County in the panhandle (Wilhelm and Burkhalter 1990) and from the Lake Wales Ridge in Highlands County (Buckley and Hendrickson 1988).

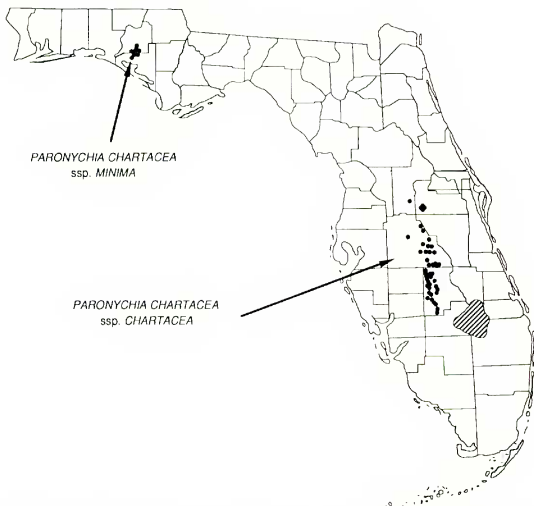


FIG. 2. Range of *Paronychia chartacea* in Florida; each subspecies is located in an area of high endemism. Extant and historic sites are plotted for ssp. *chartacea*; Core (1941) listed a few collections from DeSoto County, but county lines were later redrawn, and those sites are now in Highlands County.

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